SECTION 4
MAINTENANCE

PREVENTIVE MAINTENANCE

Air Filter

Care must be taken to assure free ventilation of the Type 570 inasmuch as some of the components are operated at dissipation levels such that excessive interior temperatures will result without adequate air circulation. To assure free passage of air the instrument must be placed so that the air intake is not blocked and the filter must be kept clean. Moreover, the side panels and bottom cover must be in place for proper air circulation. Do not remove the covers except during maintenance.

A washable EZ KLEEN filter is used at the air intake part of the instrument. Under normal operating conditions the filter should be inspected and cleaned if necessary every three to four months. More frequent inspection is required when the operating conditions are more severe.

The following cleaning instructions are issued by the filter manufacturer:

(1) If grease or dirt load is light, remove filter from installation and rap gently on hard surface to remove loose dirt. Flush remaining dirt or grease out of filter with a stream of hot water or steam.
(2) If load is too heavy for treatment described in (1), prepare mild soap or detergent solution in pan or sink deep enough to cover filter when laid flat. Agitate filter up and down in solution until grease or dirt is loosened and floated off.
(3) Rinse filter and let dry.
(4) Dip or spray filter with fresh Filter Coat or Hand! Coater. These products are available from the local representative of the Research Products Corporation and from most air conditioner suppliers.

Fan Motor

The fan motor bearings should be lubricated every three or four months with a few drops of light machine oil. Failure to lubricate the bearings periodically will cause the fan to slow down or stop, thereby causing the instrument to overheat.

Visual Inspection

You should visually inspect the entire oscilloscope every few months for possible circuit defects. These defects may include such things as loose or broken connections, damaged banana jacks, improperly seated tubes, scorched wires or resistors, or broken terminal strips. For most visual troubles the remedy is apparent; however, particular care must be taken when heat-damaged components are detected. Overheating of parts is often the result of other, less apparent, defects in the circuit. It is essential that you determine the cause of overheating before replacing heat-damaged parts in order to prevent further damage.

Soldering and Ceramic Strips

Many of the components in your Tektronix instruments are mounted on ceramic terminal strips. The notches in these strips are lined with a silver alloy. Repeated use of excessive heat, or use of ordinary tin-lead solder will break the silver-to-ceramic bond. Occasional use of tin-lead solder will not break the bond if excessive heat is not applied.

If you are responsible for the maintenance of a large number of Tektronix instruments, or if you contemplate frequent part changes, we recommend that you keep on hand a stock of solder containing about 3% silver. This type of solder is used frequently in printed circuitry and should be readily available from radio-supply houses. If you prefer, you can order the solder directly from Tektronix in one pound rolls. Order by Tektronix part number 251-514.

Because of the shape of the terminals on the ceramic strips it is advisable to use a wedge-shaped tip on your soldering iron when you

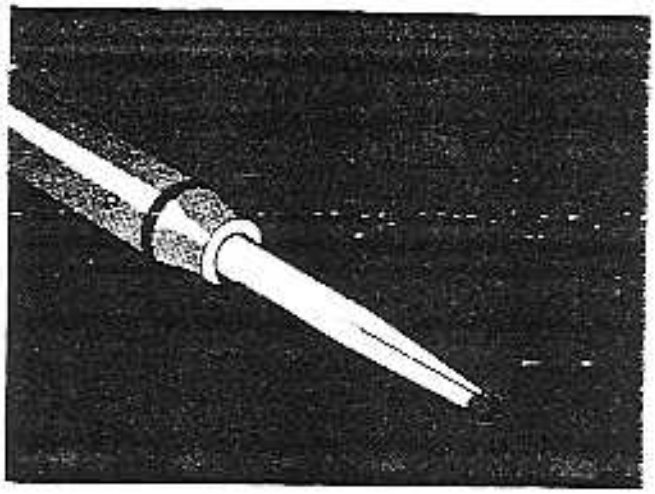

Fig. 4-1. Soldering iron tip properly shaped and tinned.

are installing or removing parts from the strips. Fig. 4-1 will show you the correct shape for the tip of the soldering iron. Be sure to file smooth all surfaces of the iron which will be tinned. This prevents solder from building up on rough spots where it will quickly oxidize.

When removing or replacing components mounted on the ceramic strips you will find that satisfactory results are obtained if you proceed in the manner outlined below.

1. Use a soldering iron of about 75-watt rating.

2. Prepare the tip of the iron as shown in Fig. 4-1.

3. Tin only the first 1/16 to 1/8 inch of the tip. For soldering to ceramic terminal strips tin the iron with solder containing about 3% silver.

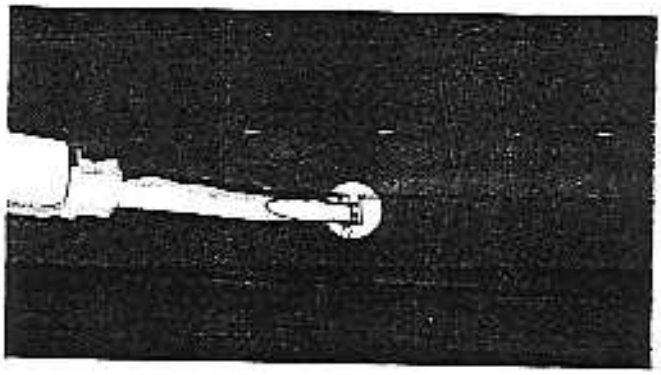

Fig. 4-2. Correct method of applying heat in soldering to a ceramic strip.

4. Apply one corner of the tip to the where you wish to solder (see Fig.

5. Apply only enough heat to make the so flow freely.

6. Do not attempt to fill the notch on the with solder; instead, apply only enough so to cover the wires adequately, and to for slight fillet on the wire as shown in Fig 4-3.

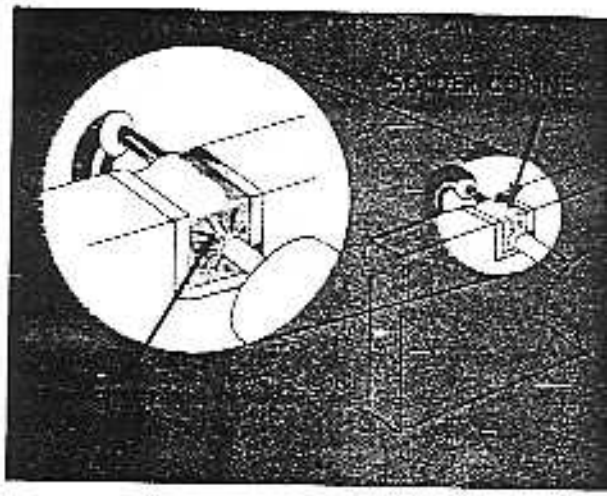

Fig. 4-3. A slight fillet of solder is formed around the wire when is applied correctly.

In soldering a metal terminal (for examp pins on a tube socket) a slightly differ technique should be employed. Prepare iron as outlined above, but tin with ordina tin-lead solder. Apply the iron to the part be soldered as shown in Fig. 4-4. Use enough heat to allow the solder to flow fre along the wire so that a slight filler will formed as shown in Fig. 4-4.

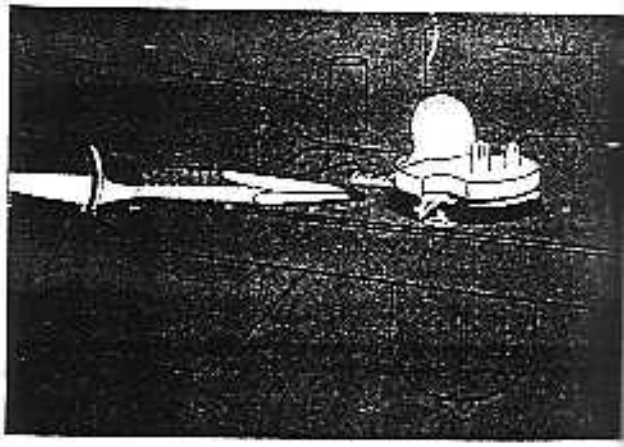

Fig. 4-4. Soldering to a terminal. Note the slight fillet of solde exaggerated for clarity--formed around the wire.

General Soldering Consideration

When replacing wires in terminal slots clip the ends neatly as close to the solder joint as possible. In clipping the ends of wires take care the end removed does not fly across the room as it is clipped.

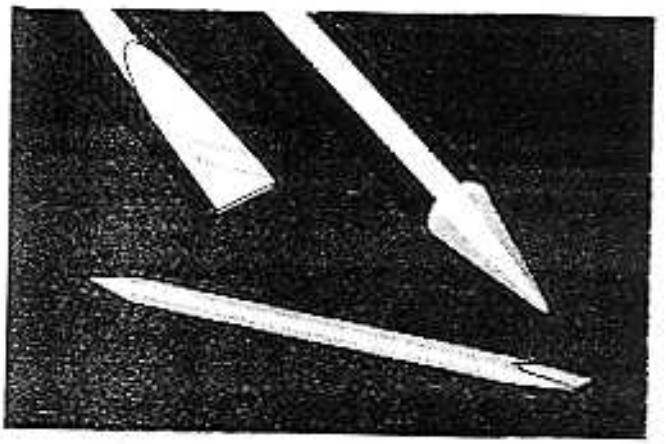

Fig. 4-4. A soldering aid constructed from a 1/4 inch wooden dowel.

Occasionally you will wish to hold a bare wire in place as it is being soldered. A handy device for this purpose is a short length of wooden dowel, with one end shaped as shown in Fig. 4-5. In soldering to terminal pins mounted in plastic rods it is necessary to use some form of "heat sink" to avoid melting the plastic. A pair of long-nosed pliers (see Fig. 4-6) makes a convenient tool for this purpose.

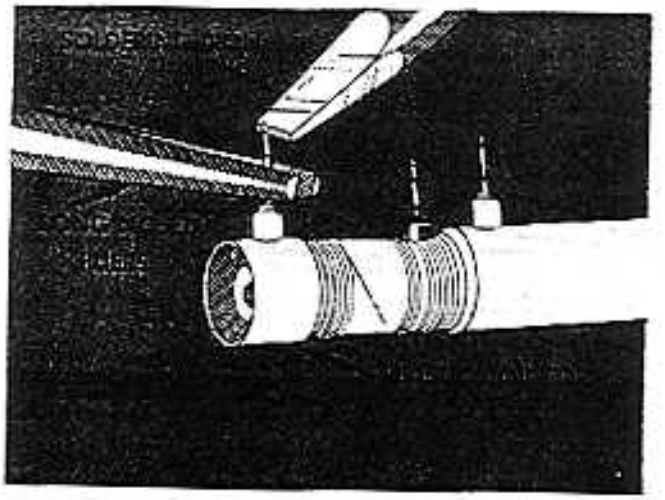

Fig. 4-5. Soldering to a terminal mounted in plastic. Note the use of the long-nosed pliers between the iron and the coil form to absorb the heat.

Ceramic Strips

Two distinct types of ceramic strips have been used in Tektronix instruments. The earlier type mounted on the chassis by means of #2-56 bolts and nuts. The later type is mounted with snap-in, plastic fittings. Both styles are shown in Fig. 4-7.

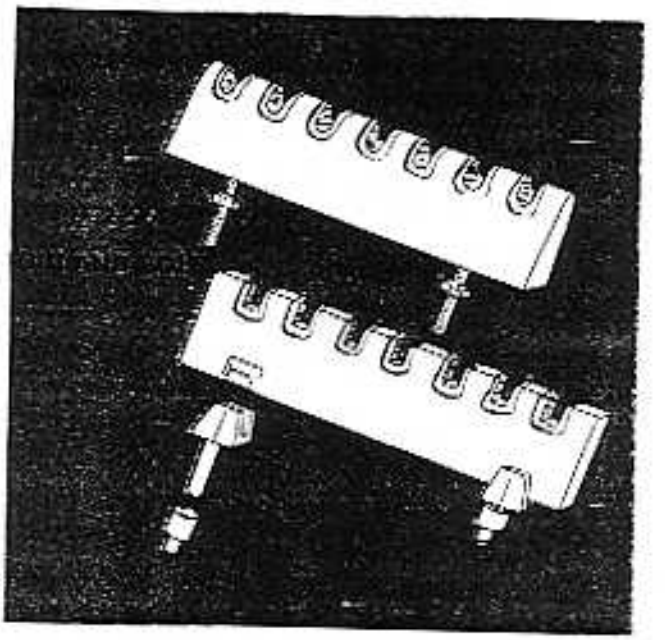

Fig. 4-7. Two types of ceramic strip mountings.

To replace ceramic strips which bolt to the chassis, screw a #2-56 nut into each mounting bolt, positioning the bolt so that the distance between the bottom of the bolt and the bottom of the ceramic strip equals the height at which you wish to mount the strip above the chassis. Insert the bolts through the holes in the chassis where the original strip was mounted, placing a #2 star-washer between each nut and the chassis. Place a second set of #2 flat-washers on the protruding ends of the bolts, and fasten them firmly with another set of #2-56 nuts.

Mounting Later Ceramic Strips

To replace strips which mount with snap-in plastic fittings, first remove the original fittings from the chassis. Assemble the mounting post on the ceramic strip. Insert the nylon collar into the mounting holes in the chassis.

Carefully force the mounting post into the nylon collars. Snip off the portion of the mounting post which protrudes below the nylon collar on the reverse side of the chassis.

NOTE

Considerable force may be necessary to push the mounting rods into the nylon collars. Be sure that you apply this force to that area of the ceramic strip directly above the mounting rods.

TROUBLESHOOTING

This section of the manual contains information for troubleshooting your oscilloscope. Before attempting to troubleshoot the instrument, however, make sure that any apparent trouble is actually due to a malfunction within the instrument and not to improper control settings. Instructions for the operation of the oscilloscope are contained in the Operating Instructions section of this manual.

If your Type 570 Oscilloscope fails to operate, make sure that it is properly connected to a source of power. If the pilot lamp on the front panel, and the fan at the rear of the instrument, do not come on when the instrument is turned on, check the source of power, the power cord connections and the power line fuse.

If the instrument is turned on, but no spot or trace is visible on the crt, check the POSITION and INTENSITY controls. Be sure that the signal is not driving the beam off the screen.

Troubles are usually caused by tube failure, and you can frequently correct them by finding the bad tube and replacing it with a good one. However sometimes a tube burns up resistors or overstresses capacitors when it fails. In these cases you will also have to find the bad components. Sometimes you can find them by visual inspection. One way to find bad tubes is to try replacing suspected tubes with good ones. If possible, replace all suspected tubes at one time, and if the trouble is eliminated, return the old tubes, one at a time, until the offending one is discovered.

Although your Type 570 Oscilloscope is a complex instrument, it can be conveniently divided into basic circuits, as shown on the Block Diagram. The first circuits to check, for practically any type of trouble, are the low-voltage power supplies. Proper operation of every circuit in the Type 570 Oscilloscope depends on proper operation of the regulated and unregulated power supplies.

All the regulated supplies should be within five per cent of their rated values and should remain steady as the line voltage is varied from 105 to 125 volts or 210 to 250 volts. See the Calibration Procedure for the low-voltage power supply test points.

WARNING

Be careful of the power-supply voltages. The lower-voltage buses are considerably more dangerous than the high voltages in the crt circuit, due to the higher current capabilities and the larger filter capacitors used.

All low-voltage power supply capacitors should be discharged prior to working on the instrument. This procedure must be used when working around or on the Floating Power Supply.

The cathode-ray tube display can help in locating the source of trouble. If there is a horizontal trace on the crt but no vertical deflection, check the Plate Sweep Generator and Vertical Amplifier fuses in the top access panel or on the front panel, depending upon serial range of instrument.

If no spot is visible check the positioning controls. Then advance the INTENSITY Control to see if there is a glow indicating a spot positioned off the crt. If no spot can be obtained short the horizontal deflection plates together and the vertical plates together. If no spot is obtained check the high voltage power supply and the crt.

If the spot is returned to the screen by shorting the deflection plates, check the deflection amplifier concerned.

If an abnormal display is obtained on the crt, the Block Diagram along with the knowledge of how the instrument works, will enable the trouble producing circuit to be determined. The

areas for the different circuits will be found printed on the chassis.

Heater-to-cathode leakage in certain critical tubes will cause vertical hum, especially in the more sensitive positions of the MA/DIV switch. If this appears only in the PLATE position of the PLATE-SCREEN-GRID selector the most likely tubes are V315 and V316 in the Plate-Sweep Generator. If it appears only in the GRID position of the PLATE-SCREEN-GRID selector, suspect V115 or V180 in the Step Amplifier.

NOTE

After servicing the Type 570 Oscilloscope, it is important to check its calibration. For this, refer to the Calibration Procedure section of this manual.